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Prevailing Buffalo Calf Rearing Practices and Mortality Patterns in the Operational Area of Dairy Vigyan Kendra, Gujarat

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ABSTRACT

Background: The study aimed to observe the prevailing buffalo calf rearing practices and mortality patterns in the operational area of Dairy Vigyan Kendra (DVK), Vejalpur, Gujarat, India.

Methods: Using the simple random sampling method, 240 buffalo owners from 24 villages of 6 talukas from the operational area of Dairy Vigyan Kendra were selected. The data were collected based on the interview schedule.

Result: The majority of buffalo owners had not adopted the different management practices *viz*., provision of milk replacer, calf starter, mineral mixture, salt, deworming agent at every month up to six months and vaccine. An overall buffalo calf mortality was observed 24.26% in the study area. There was a higher mortality rate in male calves (45.00%) than female buffalo calves (14.58%) because of negligence towards the male calf. The mortality rate observed was higher during the first three months of age (90.98%) and during winter (45.08%). A negative and significant relationship was observed between some important calf rearing practices like colostrum feeding time, providing milk replacer, calf starter, concentrate feed, mineral mixture, dewormer and vaccines to calves with female buffalo calf mortality. Participation in various animal husbandry training programs and adoption of scientific management practices to large herd size farms will be helpful to reduce female buffalo calf mortality rate at the field level.

Key words: Buffalo calves, Buffalo owners, Mortality, Pattern.

INTRODUCTION

Buffalo plays a crucial role in the Indian dairy sector, especially in the rural economy, with about 49% in milk production and 19.05% in meat production (Anonymous, 2019). Calf rearing is an essential aspect of dairy farming, which is often neglected by dairy farmers. This must be kept in mind that improved calf rearing ensures animals with better growth, health and productivity. Due to the high mortality of calves in India because of mismanagement, calf rearing should be taken upon scientific lines and economically achieved (Banerjee, 1998). Considering these facts, there is a vast scope for increased productivity through improved management practices, including calf rearing practices to get maximum profits (Singh *et al.,* 2012). It is estimated that 20% of neonatal calf mortality can reduce net profit by 38% (Radostits *et al.,* 2000). Very high buffalo calf mortality has been reported, particularly during the first few months of their postnatal life (Shivarudrappa *et al*., 2013; Shakya *et al.,* 2017). The present study was conducted to investigate the prevailing buffalo calf rearing practices and mortality patterns in the operation area of Dairy Vigyan Kendra (DVK), Vejalpur, Anand Agricultural University, Anand.

MATERIALS AND METHODS

The study was conducted among the buffalo owners in the operational area of Dairy Vigyan Kendra (DVK), Vejalpur from August to November 2020. Eleven talukas are under the operational jurisdiction of DVK. A total of six talukas of the operational area of DVK were randomly selected for the study. Four villages were selected randomly from each taluka and ten buffalo owners were randomly selected from each village, thus making the total sample of 240 buffalo owners from 24 villages were selected for the investigation by adopting Ex-Post-Facto research design. A standardized, well-structured pre-tested interview schedule was prepared in light of the objectives in consultation with the experts of Livestock Production Management. The buffalo calf mortality data were categorized based on age and sex group. During the study, the months were categorized into three seasons, *viz*. winter (November to February), summer (March to June), and monsoon (July to October). The data were collected and analyzed with suitable statistical techniques. SPSS 21 (IBM, USA) was used to analyze the collected data. The mortality rate is the ratio of the number of deaths in the year to the average total population of the year. The mortality rate has three essential elements, (a) a specifically defined

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population group- the denominator, (b) the time period and (c) the number of deaths occurring in that population group during that time period- the numerator.

$$\text{Mortality rate} = \frac{\text{Number of died animal in the study area}}{\text{Total animal population in the study area}}$$

RESULTS AND DISCUSSION

The majority of buffalo owners belonged to the middle age group with primary to secondary education level with marginal to small size of landholdings and had kept Surti and Mehsani buffalo with medium herd size. The area selected for the study is not having home tract of any specific breed. However, most farmers keep a mixed population of Surti and Mehsani buffaloes because the home tract of both these breeds is just nearer to their living area. The majority (58.33%) of them have not received training related to animal husbandry. They are not passionate to learn new things and have less interest in keeping livestock alone. For the breeding of buffaloes, the majority of buffalo owners (52.92%) were using artificial insemination technique (Table 1).

A perusal of the data shown in Table 2 indicates that a cent per cent of buffalo owners remain present during the calving process. The majority of buffalo owners had adopted suckling (99.58%), cleaned the calf immediately after birth (88.75%), and had not used disinfectant after cutting of navel cord (87.91%). Maousami *et al.* (2013) also reported a similar result with 96.00% of owners not disinfecting the navel cord after cutting. Due to cent per cent farmers' presence during calving, the majority of them used to clean the buffalo calf after calving. As owners are aware of buffalo's powerful mothering instinct and not letting down milk in the

Table 1: Profile of buffalo owners (n=240).

Profile of buffalo owners	Total	
	Frequency	Per cent
Age		
Young (≤35 years)	31	12.92
Middle-aged (36-50 Years)	125	52.08
Old (>50 Years)	84	35.00
Education		
Illiterate	33	13.75
Primary education (up to 8th standard)	87	36.25
Secondary education (9th to 10th standard)	68	28.33
Higher secondary education (11th to 12th standard)	28	11.67
Graduate and above	24	10.00
Landholding		
Landless farmers	3	1.25
Marginal farmer (Up to 1.00 ha)	163	67.92
Small farmer (1.01 to 2.00 ha)	51	21.25
Medium farmer (2.01 to 4.00 ha)	16	6.66
Large farmer (Above 4.00 ha)	7	2.92
Buffalo herd composition		
Surti	169	70.42
Mehsani	156	65.00
Non-descript	131	54.58
Banni	15	6.25
Jaffrabadi	2	0.83
Herd Size (in Standard Animal Unit)		
Small (≤ 4 SAU)	89	37.08
Medium (4.01 to 8 SAU)	142	59.17
Large (> 8 SAU)	9	3.75
Training in animal husbandry		
Training received	100	41.67
Training not received	140	58.33
Breeding method used in buffalo		
AI	127	52.92
Natural	2	0.83
Both	111	46.25

Table 2: Prevailing buffalo calf rearing practice (n=240).

Prevailing practices	Frequency	Per cent
Management		
Owner's presence during calving	240	100.00
Clean the calf immediately after birth	213	88.75
Cut the navel cord of calf	79	32.91
Cut navel cord with a sharp object	77	32.08
Cut navel cord with a sterilized sharp object	2	0.83
Which disinfectant use after cutting of navel cord?		
A. Tincture of iodine	4	1.67
B. Other (Neem or Turmeric paste)	25	10.42
C. No disinfectant use	211	87.91
Calf rearing method		
A. Suckling	239	99.58
B. Weaning method	1	0.42
Feeding		
Feeding of colostrum to the calf	239	99.58
Time of first colostrum feeding		
A. Within one hour of birth	54	22.50
B. One to four hours of birth	117	48.75
C. After dropping of placenta	69	28.75
Provide milk to the calf	237	98.75
Quantity of milk provides to calf		
A. One quarter	171	71.25
B. Two quarter	44	18.33
C. *Ad lib*	12	5.00
D. As per body weight	10	4.17
Milk feeding up to age		
A. One month	29	12.08
B. Two months	22	9.17
C. Three months	21	8.75
D. More than three months	165	68.75
Providing milk replacer to calf	57	23.75
Providing calf starter to calf	65	27.08
Providing concentrate feed to calf	211	87.92
Started giving concentrate after attaining the age of		
A. One month	66	27.50
B. Two Months	94	39.17
C. Three months	34	14.17
D. Four months	17	7.08
Started giving green fodder after attaining the age of		
A. One month	190	79.17
B. Two Months	50	20.83
Providing mineral mixture to calf	78	32.50
Providing salt to calf	42	17.50
Housing of calf		
Housing facility		
A. Separate	6	2.50
B. Same place with a dam in one side	234	97.50
Bedding facility	18	7.50
Protection against inclement weather		
A. Winter (Heating facility, Provide gunny bag)	162	67.50

Table 2: Continue..

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B. Summer (Shed, Normal and freshwater)	240	100.00
C. Monsoon (Shed)	210	87.50
Health		
Deworming of calf	203	84.58
Deworming at 21 days age of the calf	133	55.42
Deworming at every month up to 6 months of calf	45	18.75
Deworming at every six months of calf	196	81.67
Source of dewormer		
A. Co-operative dairy	202	84.17
B. Govt. Vet. Dispensary	18	7.50
C. Medical store	26	10.83
D. Private Veterinarian /Para vet.	23	9.58
Use dewormers rotationally	53	22.08
Vaccination of calf	149	62.08
Which vaccines are given to your calf?		
A. Brucellosis	3	1.25
B. FMD	149	62.08
C. HS	78	32.50
Type of treatment		
A. Called a vet. or para-vets immediately when calf fell sick	180	75.00
B. Used indigenous medicines then a vet. was called	59	24.58
C. Never called a veterinarian	1	0.42

absence of their young ones, they have adopted suckling. It was observed that only 32.91% of farmers had cut the navel cord of buffalo calves. In their study, Tiwari *et al.* (2007) observed that none of the farmers were used to cut the navel cord of the newborn.

The majority of buffalo owners had provided colostrum (99.58%), milk (98.75%) and concentrate feed (87.92%) to their calf. More than one-fifth of the buffalo owners provided colostrum within one hour of calf birth (22.50%). A similar result related to the present study was reported by Mahla *et al.* (2015). Contrary to this, Tiwari *et al.* (2007) observed that the majority (87.80%) of the farmers had supplied colostrum after expulsion of placenta. Late supplementation of colostrum by the buffalo owner is mainly due to a lack of awareness about scientific animal husbandry practices. About 27.08% and 23.75% of buffalo owners had provided calf starter and milk replacer to their calf, respectively. The majority of buffalo owners had used deworming agents for their calves (84.58%) but not maintained regularity as per scientific recommendation. The majority of the buffalo owners knew the effect of deworming on calves. They used deworming agents to calves initially but did not follow the standard deworming schedule.

Similarly, Tiwari *et al.* (2007) also observed lacunae in the regular provision of deworming agents to the calves. More than half of the buffalo owners had given FMD vaccine to their buffalo calves, while vaccination for Hemorrhagic Septicemia and Brucellosis was observed very low, respectively. None of them had given Anthrax and BQ vaccines to their buffalo calves.

Data in Table 3 indicated that the buffalo calf mortality rate was observed 45.00% and 14.58% in male and female buffalo calves, respectively with an average of 24.26% in the operational area of DVK, Gujarat. A similar result was obtained by Maousami *et al.* (2013) where they have reported an average 22.45% mortality in buffalo calves. A higher mortality rate may be due to the negligence of males. There was an overall 24.26% mortality rate observed in the buffalo calves in the study area. Shakya *et al.* (2017) reported that overall buffalo calf mortality in and around Jabalpur district was 42.11% which is higher compared to our study. Tiwari *et al.* (2007), in their study of buffalo calf health care in commercial dairy farms, had also reported 81.09% mortality which was just four times more than our study.

Most of the death in buffalo calves was observed during the first three months of age (90.98%). Shakya *et al.,* (2017) reported similar results with the present study. In the present study, it was found that supplementation of colostrum within one hour was very less, that may result in poor development of immunity results in higher mortality rate in the initial period of life. The buffalo calf mortality rate was found to be higher in winter (45.08%), followed by summer (29.51%) and monsoon (25.41%) (Table 4). Similar results were obtained by Patil *et al.* (1991), who reported the highest mortality (38.29%) during winter (November-January), followed by the monsoon season (32.5% in June-October) and summer (29.2% in February-May). The reason of the higher mortality rate in winter may be that in this study, it was observed that the housing practice of protecting animals from inclement weather that

Table 3: Buffalo calf mortality rate.

Sex	No. of calf born in the last year	No. of calf died in the last year	Mortality rate (Per cent)
Male	160	72	45.00
Female	343	50	14.58
Total	503	122	24.26

Table 4: Mortality pattern of buffalo calves in different age groups and seasons.

Age/season	No. of calves died			Per cent of total calf died		
	Male	Female	Total	Male	Female	Total
Birth to 3 months	70	41	111	97.22	82.00	90.98
3.01 to 6 months	2	6	8	2.78	12.00	6.56
More than 6 months	0	3	3	0.00	6.00	2.46
Total	72	50	122	100.00	100.00	100.000
Winter	30	25	55	41.67	50.00	45.08
Summer	17	19	36	23.61	38.00	29.51
Monsoon	25	6	31	34.72	12.00	25.41
Total	72	50	122	100.00	100.00	100.00

Table 5: Correlation between the profile of buffalo owners and health management practices with female buffalo calf mortality (n=240).

Variables/health management practices	r value
Age	0.000^{NS}
Education	-0.079^{NS}
Landholding	0.054^{NS}
Herd size	0.283**
Training in animal husbandry	-0.163*
Clean the calf immediately after birth	-0.110^{NS}
Cut the navel cord of calf	-0.032^{NS}
Feeding of colostrum to the calf	0.033^{NS}
Time of colostrum feeding	-0.185**
Provide milk to the calf	-0.035^{NS}
Providing milk replacer to calf	-0.286**
Providing calf starter to calf	-0.151*
Providing concentrate feed to calf	-0.313**
Providing mineral mixture to calf	-0.203**
Providing salt to calf	-0.074^{NS}
Bedding facility	0.010^{NS}
Deworming of calf	-0.406**
Vaccination of calf	-0.233**

**= Significant at 0.01 level; *= Significant at 0.05 level; ^{NS}= Non-significant.

is for cold is very less (67.50%) as compared to two other seasons (100% for summer and 87.50% monsoon). The increased mortality rate during the cold season might be attributed to environmental stress associated with cold inclement weather wherein sudden climatic changes make calves prone to conditions like pneumonia and diarrhoea. High relative humidity and less bright hours lead to unhygienic calf sheds and wet beddings that make young calves more susceptible to infections (Yadav *et al.,* 2019).

Table 5 revealed that the correlation between buffalo owners' received training in animal husbandry with female buffalo calves mortality was found negative and significant. Awareness and knowledge gained by the buffalo owners in training are helping them to raise their buffalo calves effectively. There was a positive and significant relationship between herd size and female buffalo calves mortality. This may be due to the larger herd size. Higher calf mortality with increase in herd size in commercial dairy farms was reported by Sreedhar and Sreenivas, (2015). Higher calf mortality in the larger herd may be associated with a larger group size of calves resulted in lesser time spent per calf or more opportunity for pathogen exchange, while improved management and care in the small herd may improve survival rate (Zucali *et al.,* 2013; Seppä-Lassila *et al.,* 2016). A major reason of urban dairy farm mortality was the parasitic infestation in the calves due to which their health deteriorated and they often died (Sharma and Mishra, 1987). There was a negative and significant relationship between colostrum feeding time, providing milk replacer, calf starter, concentrate feed, mineral mixture, dewormer, and vaccines to calves with female buffalo calf mortality (Table 5). The risk of calf mortality increases drastically with delay in colostrum feeding (Zucali *et al.,* 2013) due to inadequate passive transfer of immunoglobulin through the gut, which may subsequently suppress the disease resistance capacity of calves (Godden, 2008). Pal *et al.* (2016) observed 79-85 percent reduction in calf mortality under field conditions when deworming was practiced from 1-2 weeks after birth. There was a negative and non-significant correlation between cleaning the calf immediately after birth, cutting the navel cord, provide milk and salt to the calf with female buffalo calf mortality. Some of the animal health management practices like providing milk, earlier colostrum feeding, milk replacer, calf starter,

concentrate feed, mineral mixture and salt, deworming and vaccination, cleaning the calf immediately after birth and cutting the navel cord to calves was associated with decrease the female buffalo calf mortality (Table 5).

CONCLUSION

The majority of buffalo owners had not adopted the practices of providing milk replacer, calf starter, mineral mixture, salt, dewormer at every month up to six months and vaccine of HS, Brucellosis, Anthrax and BQ. Buffalo calf mortality was observed 45.00 and 14.58 per cent in male and female buffalo calves, respectively. Overall, the buffalo calf mortality rate was 24.26%, with a higher mortality rate (90.98%) during the initial age (first three months) in the operational area of DVK. The training programme should be organized on scientific buffalo calf rearing practices and proper management practices to large herd size farms for reducing calf mortality rate at the field level. Some of the animal health management practices like providing milk, earlier colostrum feeding, milk replacer, calf starter, concentrate feed, mineral mixture and salt, deworming and vaccination, cleaning the calf immediately after birth and cutting the navel cord to calves which can reduce the female buffalo calf mortality in the field level.

Conflict of interest

All authors declare that they have no conflict of interest.

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